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Asthma in New Jersey

Chapter 3: Children Living with Asthma

The New Jersey Department of Health (NJDOH) monitors asthma prevalence using the New Jersey Behavioral Risk Factor Survey (NJBRFS), an ongoing population-based telephone survey of non-institutionalized adult residents aged 18 years and older. If there are children 17 years or younger in the household, the adult is interviewed about a randomly selected child. The NJBRFS represents a geographical subset of the national Behavioral Risk Factor Surveillance System (BRFSS), which was established in 1984 and is currently implemented across all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam where it is being used to monitor and improve the health of residents. The Asthma Call-back Survey (ACBS) was later developed by the CDC Air Pollution and Respiratory Health Branch as a comprehensive asthma related extension of the BRFSS. Respondents who report a lifetime asthma history on the BRFSS are then called back in approximately two weeks to complete the ACBS, which was designed to collect detailed information about people living with asthma. If both the randomly selected child and the adult who answered the BRFSS questions have asthma, only one is selected for the ACBS. In 2008, New Jersey joined 35 other states in administering the ACBS among respondents reporting a lifetime asthma history on the BRFSS.

This chapter describes children living with asthma as derived from the 2008-2010 ACBS surveys. Estimates for children with current asthma are based on the number of adult ACBS respondents who report that a selected child with lifetime asthma still has asthma.

Asthma History

Figure 1

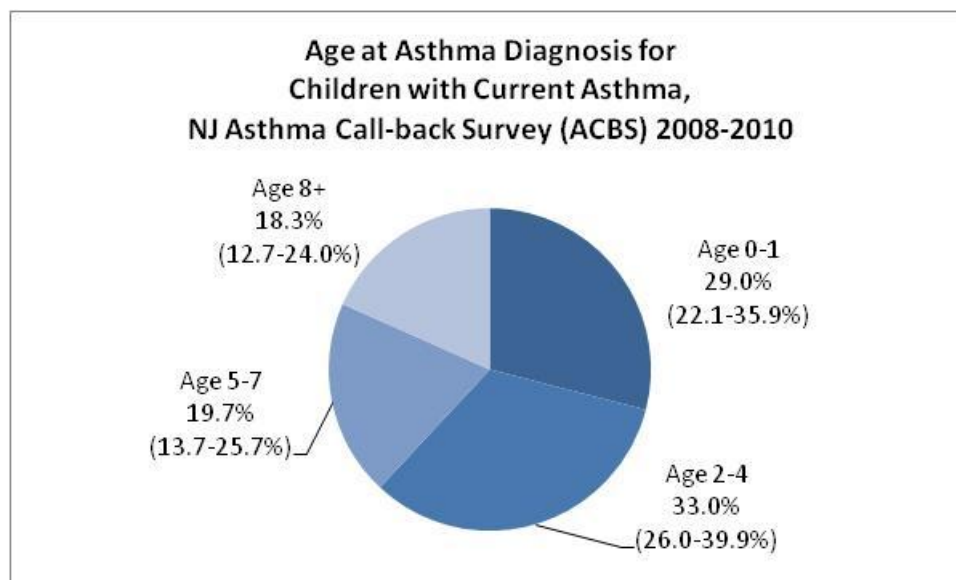


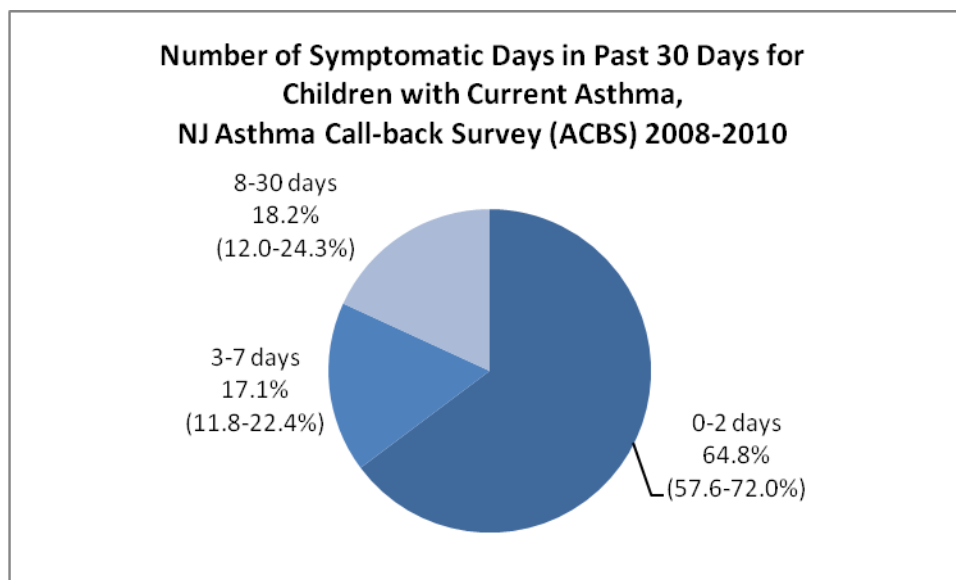
Table 1	
Percent Diagnosed Before Age Four, Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% Confidence Interval)
Sex	
Males	52.0 (42.9-61.2)
Females	59.0 (47.8-70.3)
Age	
0-4 years	90.9 (83.7-98.1)
5-9 years	55.5 (40.6-70.5)
10-14 years	49.0 (36.8-61.3)
15-17 years	29.0 (13.0-45.1)
Race/Ethnicity	
White, Non-Hispanic	54.5 (44.1-64.9)
Black, Non-Hispanic	52.4 (36.1-68.7)
Hispanic	58.4 (41.0-75.7)
Household Income	
Less than -\$34,999	76.1 (63.8-88.4)
\$35,000-\$74,999	48.9 (35.4-62.4)
\$75,000 +	46.6 (34.6-58.7)
Respondent Education	
High School Graduate or less	74.4 (63.4-85.3)
Attended College or Technical School	51.8 (37.4-66.2)
College or Technical School Graduate	46.6 (35.9-57.2)
Total	54.9 (47.3-62.4)

Based on the Rao-Scott Chi-Square Test, the percent diagnosed before age four is associated with age ($p < .0001$), household income ($p = .0027$) and respondent education ($p = .0071$). Significant differences are shown in bold.

Figure 1 above breaks down the ages at which children with current asthma were diagnosed. About 55 percent of children with current asthma were diagnosed before age four, as shown in Table 1 above. Children in households where the income was less than \$35,000 per year and those where the survey respondent had a high school education or less were more likely to be diagnosed before age four than those in households with higher income or a respondent with higher education, respectively. There were no significant differences by sex or race/ethnicity. The age at diagnosis did not appear to vary by year from 2008 to 2010.

Symptoms and Episodes

Figure 2



Symptomatic days. About 53 percent (95 percent confidence interval 46.1-60.6 percent) of children with current asthma did not experience any asthma symptoms in the past thirty days. As shown in Figure 2 above, about 65 percent had two or less symptomatic days, about 17 percent had between three and seven symptomatic days, and about 18 percent had between 8 and 30 symptomatic days. Reports of symptomatic days did not change significantly in the period 2008 to 2010. Symptomatic days did not vary by sex, age, race/ethnicity, household income or respondent education.

Night symptoms. About 74 percent (95 percent confidence interval 66.8-80.2 percent) of children with current asthma had no trouble sleeping in the past thirty days; about 26 percent (95 percent confidence interval 19.8-33.2 percent) had trouble sleeping on one or more days. About 19 percent of children with current asthma (95 percent confidence interval 12.9-24.4 percent) had trouble sleeping on six or fewer days. Reports of the number of days symptoms caused sleep problems did not change significantly in the period 2008 to 2010. Night symptoms did not vary by sex, age, race/ethnicity, household income or respondent education.

Asthma episodes or attacks. About 46 percent (95 percent confidence interval 38.2-53.0 percent) of children with current asthma had any asthma episode or attack in the past 12 months. About 34 percent (95 percent confidence interval 27.4-41.4 percent) had one or more episodes in the past three months. Neither measure changed significantly in the period from 2008 to 2010 and neither measure varied by any of the demographic variables.

Health Care Insurance, Utilization and Activity Limitation

Table 2 shows a detailed breakdown of seven measures of health care utilization and activity limitations for children with current asthma. None of the measures showed a change in prevalence from 2008 to 2010.

Table 2	
Children with Current Asthma and Various Measures of Access, Utilization and Activity Limitation in Past Year, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% Confidence Interval)
Insurance status	
Insured past 12 months	90.4 (86.1-94.7)
Gaps or no insurance in past 12 months	9.6 (5.3-13.9)
Type of insurance	
Parent's employer or other	74.4 (67.2-81.5)
Medicare/Medicaid/NJ FamilyCare (CHIP)	25.6 (18.5-32.8)
Routine doctor visits for asthma, past year	
None	27.5 (20.8-34.3)
1-2 visits	42.8 (36.0-49.6)
3 or more visits*	29.7 (22.8-36.5)
Urgent doctor visits for asthma, past year	
None	64.4 (57.1-71.7)
One or more*	35.6 (28.3-42.9)
ER visits for asthma, past year	
None	83.6 (78.4-88.7)
One or more	16.4 (11.3-21.6)
Missed school or child care days due to asthma, past year**	
No days	43.9 (36.6-51.2)
1-3 days	24.8 (19.2-30.4)
4-5 days	15.1 (9.5-20.6)
6 or more days*	16.3 (11.0-21.5)
Activity limited due to asthma, past year	
Not at all	43.1 (35.9-50.3)
A little	40.2 (33.4-47.0)
A moderate amount or a lot	16.7 (10.4-23.0)

*Note—these measures allowed responses of 1-365. There appeared to us to be coding errors involving values of 77 and 88, so these were classified as missing.

**Of children who attended school or child care—homeschooled children are counted with respect to missing schooling due to asthma but excluded with respect to missing child care.

Insurance status. Almost ten percent of children with current asthma either had no insurance at the time of the survey, or had gaps in insurance during the past year. About 90 percent had insurance for the entire twelve-month period prior to the survey. There were no reportable significant differences by any of the demographic variables. There was an indication of a relationship with household income, but the sample was too small to construct reliable point estimates.

Type of insurance. About 26 percent of children with current asthma were insured by Medicare, Medicaid, or NJ Family Care (the Children’s Health Insurance Plan in New Jersey), while about 74 percent were insured by a parent’s employer or some other method. There were significant differences by race/ethnicity, household income and respondent education with this measure, shown in Table 3 below.

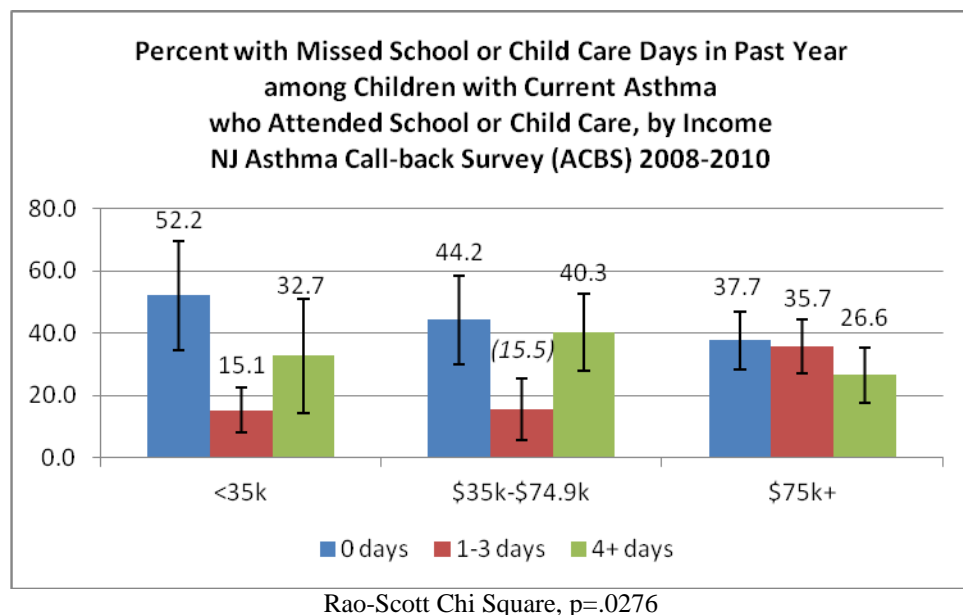
Routine doctor visits. Nearly 28 percent of children with current asthma had no visits to a doctor or other health professional for a routine checkup for their asthma in the past year. About 43 percent had one or two visits, and nearly 30 percent had three or more visits. There were no significant differences by any demographic variables.

Urgent doctor visits. Nearly 36 percent of children with current asthma had one or more visits to a doctor or other health professional in the past year for urgent treatment of worsening asthma symptoms, or for an asthma episode or attack. There were no significant differences by any demographic variables.

Emergency room visits. About 16 percent of children with current asthma had one or more asthma-related visits to an emergency room or urgent care center in the twelve months prior to the survey. There were significant differences by age and household income, as shown in Table 3. Data were collected about hospitalizations as well, but there were not enough instances of this to construct reliable estimates for children with current asthma.

Missed school or child care. About 56 percent of children with current asthma missed one or more days of school or daycare in the prior year because of their asthma. There were significant differences by household income, as shown in Figure 3 below. Higher income households were more likely than others to report one to three missing days, as opposed to no days or four or more days.

Figure 3



(Italicized numbers mean that the standard error is larger than the normal reportable range)

Activity limitation. Almost 57 percent of children with current asthma had some kind of activity limitation due to their asthma in the past year—nearly 17 percent reported that they limited their activities a moderate amount to a lot. There were significant differences by age, as shown in Figure 4. Children aged zero to four were the least likely to have reported activity limitations; those aged five to nine were the most likely to have reported limitations.

Figure 4

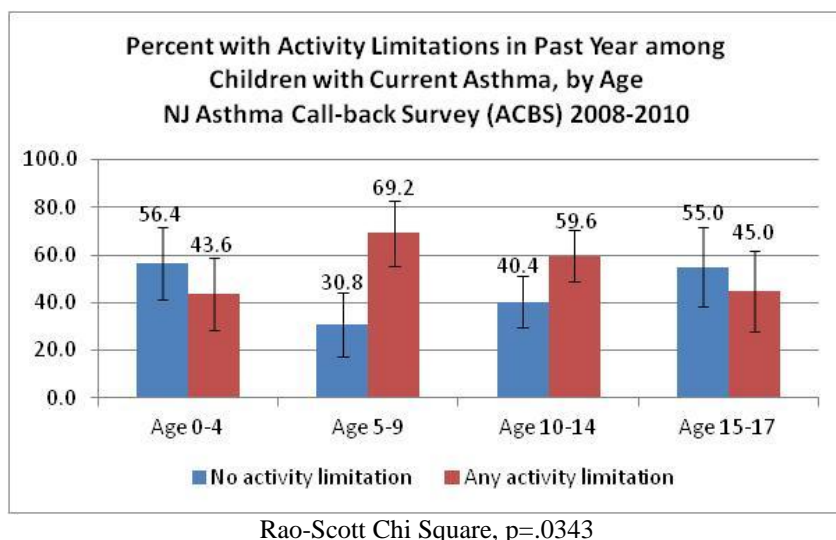


Table 3
Insurance Type, ER Visits among Children with Current Asthma,
NJ Asthma Call-back Survey (ACBS) 2008-2010

	Type of Insurance		Any ER Visit
	Parent/Other	Medicare/Medicaid/ NJ FamilyCare (CHIP)	
	Percent (95% CI)	Percent (95% CI)	Percent (95% CI)
Sex			
Males	73.2 (64.2-82.2)	26.8 (17.8-35.8)	14.0 (7.8-20.1)
Females	75.9 (64.7-87.0)	24.1 (13.0-35.3)	19.7 (10.7-28.6)
Age			
0-4 years	74.6 (60.5-88.7)	25.4 (11.3-39.5)	22.4 (9.8-34.9)
5-9 years	67.6 (51.8-83.4)	32.4 (16.6-48.2)	24.4 (12.5-36.4)
10-14 years	74.8 (63.6-85.9)	25.2 (14.1-36.4)	12.4 (5.6-19.2)
15-17 years	*	*	3.7 (0.0-7.5)*
Race/Ethnicity			
White, Non-Hispanic	88.3 (80.1-96.5)*	11.7 (3.5-19.9)*	11.7 (6.6-16.8)
Black, Non-Hispanic	66.2 (50.5-81.9)	33.8 (18.1-49.5)	*
Hispanic	54.1 (36.8-71.4)	45.9 (28.6-63.2)	*
Household Income			
Less than -\$34,999	35.2 (19.8-50.5)	64.8 (49.5-80.2)	26.8 (12.9-40.8)
\$35,000-\$74,999	78.5 (65.4-91.6)*	21.5 (8.4-34.6)*	20.1 (8.5-31.6)
\$75,000 +	97.7 (93.3-100.0)*	2.3 (0.0-6.7)*	9.4 (5.0-13.8)
Respondent Education			
High School Graduate or less	55.5 (40.6-70.4)	44.5 (29.6-59.4)	22.6 (10.2-35.0)
Attended College or Technical School	68.9 (55.4-82.4)	31.1 (17.6-44.6)	18.8 (8.7-29.0)
College or Technical School Graduate	89.0 (80.2-97.8)*	11.0 (2.2-19.8)*	11.0 (5.7-16.4)
Total	74.4 (67.2-81.5)	25.6 (18.5-32.8)	16.4 (11.3-21.6)

*Standard errors were larger than the allowable reported range—where there are significant differences, we have shown the estimate in italics to give a sense of the relationship, but the estimate is very imprecise and should be interpreted with caution. Based on the Rao-Scott Chi-Square Test, insurance type is associated with race/ethnicity (p=.0074), household income (p<.0001) and respondent education (p=.0012); the percent with any ER visit is associated with age (p=.0055) and household income (p=.0130). Significant differences are shown in bold.

Influenza (Flu) Shot

People with asthma are at increased risk for complications from influenza, so the CDC recommends annual vaccinations against seasonal influenza as well as other preventive measures for people with asthma. Only the flu shot, rather than the nasal spray, is recommended for people with asthma.

About 59 percent (95 percent confidence interval 51.5 to 66.6 percent) of children with current asthma reportedly received a flu shot in 2008-2010. The shot is not recommended for children under six months of age and there were no children that young receiving shots in the 2008-2010 survey. There was no change in the frequency of flu shots over the period, and there were no significant differences by any demographic variables. About four percent of children with current asthma (95 percent confidence interval 1.9 to 6.9 percent) reportedly got the nasal spray despite the fact that it is contraindicated.

Asthma Education

Asthma self-management education is a major component of the asthma treatment guidelines. This section of the survey asks respondents about five aspects of self-management education received either by the child or by the respondent for purposes of assisting the child. In all, about 94 percent reported some form of asthma education, and 59 percent reported three or more types of education. Table 4 below shows the specific numbers. Of children with current asthma who attended school or child care, about 56 percent of them had an asthma action plan on file at the school or child care center.

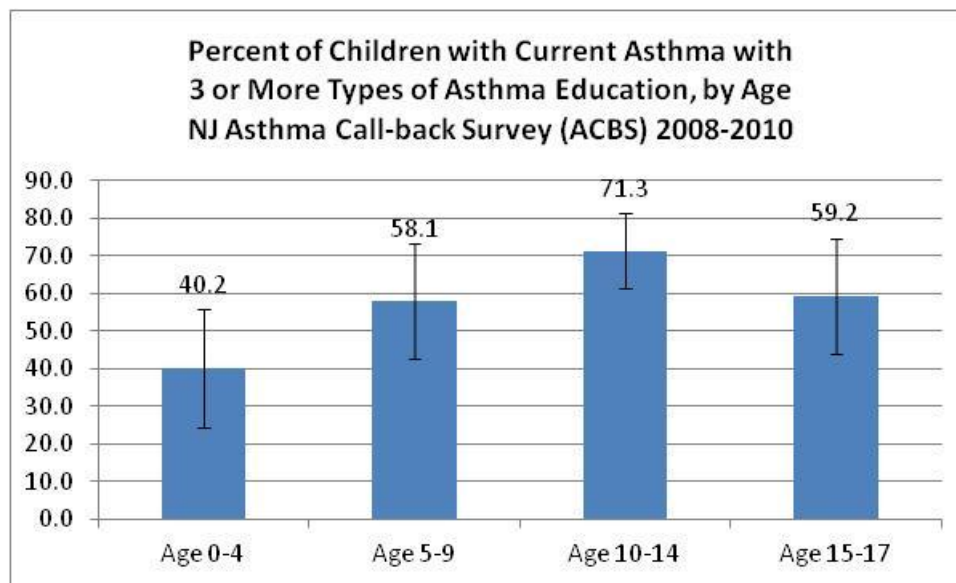
Table 4	
Children with Current Asthma with Asthma Management Education, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% Confidence Interval)
Ever taught to recognize early signs or symptoms of an asthma episode	82.0 (76.3-87.7)
Ever taught what to do during an asthma episode or attack	86.9 (81.8-91.9)
Ever taught to use a peak flow meter to adjust daily medications	44.4 (37.0-51.8)
Ever given an Asthma Action Plan	54.1 (46.5-61.7)
Ever taken a course or class on how to manage the asthma	16.0 (10.3-21.8)
Any Asthma Education	94.1 (90.8-97.5)
3 or More Types of Asthma Education	59.0 (51.4-66.5)
Asthma Action Plan at School or Child Care*	56.4 (49.4-63.4)

*For children who attended school or child care.

There were no differences in the prevalence of any of these measures by year. There were also no differences in prevalence by sex on any of these measures, and no difference by any of the demographic measures for having taken an asthma-management course or having an asthma action plan on file at school or child care.

Our analysis suggested that higher income children may be more likely than those with lower income to have received any form of asthma education, but because the percentage of all income groups getting any education was so high, it was not possible to construct reliable percentage estimates. There were differences by age in the receipt of three or more types of asthma education as shown below in Figure 5—readers should keep in mind that younger children may not be ready to receive education. For example, education on peak flow meters might not be appropriate for very young children regardless of whether the education is delivered to a caregiver or to a child. The same is true for the ability of young children to recognize or describe early signs and symptoms of an asthma episode. Furthermore, reports on education received are subject to recall bias (i.e., it could be that education is given during the ages of 10-14 and that those reporting for older children are less likely to remember the child having received it).

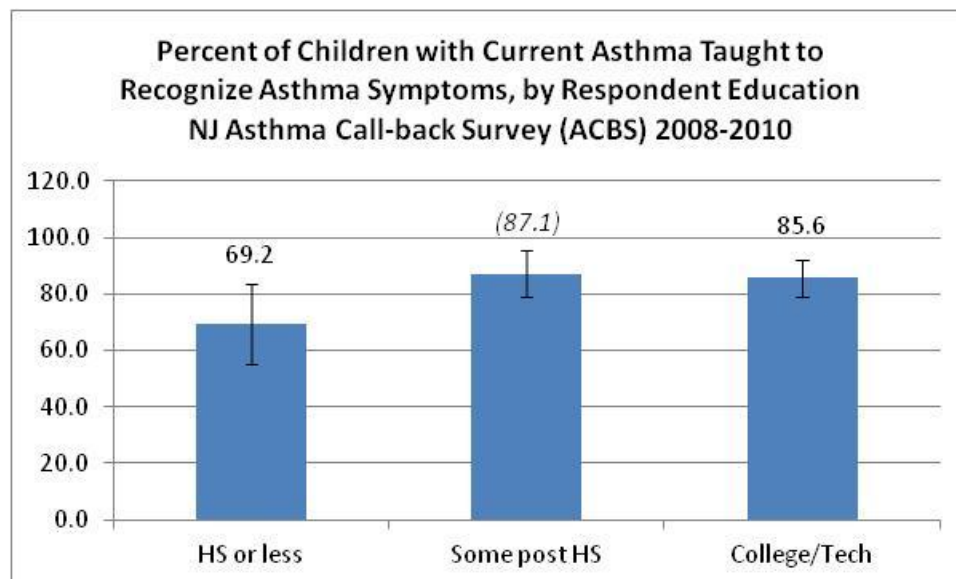
Figure 5



Rao-Scott Chi Square was $p=.0323$

Those with higher levels of education were more likely to report that children with current asthma or the caregiver had been taught to recognize the early signs and symptoms of an asthma episode, as shown in Figure 6.

Figure 6



Rao-Scott Chi Square, $p=.0184$

(Italicized numbers mean that the standard error is larger than the normal reportable range)

As shown below in Table 5, respondents for Hispanic children were less likely to report that the child or caregiver had received education about what to do during an asthma episode or attack than respondents for White, non-Hispanic children. Respondents with lower education levels were less likely to report that the child or caregiver had received education on what to do during an episode or attack than college or technical school graduates (though in the latter case there were so few cases reporting a lack of such education that reliable estimates were impossible to construct). Respondents from households with lower incomes were less likely to report that the child or caregiver had been taught to use a peak flow meter than respondents from higher-income households. Older children were more likely to have been given an asthma action plan, and to have received education about responding to asthma episodes and using peak flow meters. The relationship between household income and the respondent reporting an asthma action plan for the child approached significance.

Table 5			
Percent Receiving Two Types of Asthma Education and an Asthma Management Plan, Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010			
	Taught What to Do During Episode	Taught to Use Peak Flow Meter	Given an Asthma Action Plan
	Percent (95% CI)	Percent (95% CI)	Percent (95% CI)
Sex			
Males	88.5 (82.4-94.5)	43.5 (33.8-53.1)	54.9 (45.4-64.4)
Females	84.7 (75.8-93.6)	45.7 (34.1-57.4)	52.9 (41.3-64.4)
Age			
0-4 years	70.7 (54.0-87.3)	30.0 (12.5-47.4)*	37.2 (21.7-52.8)
5-9 years	92.9 (84.8-100.0)*	30.4 (18.1-42.7)	48.1 (33.5-62.6)
10-14 years	91.1 (85.1-97.0)*	64.1 (52.8-75.4)	65.9 (55.5-76.3)
15-17 years	85.8 (74.8-96.9)*	53.0 (37.9-68.0)	62.0 (47.7-76.4)
Race/Ethnicity			
White, Non-Hispanic	93.7 (90.3-97.2)	48.7 (38.8-58.6)	58.0 (47.6-68.4)
Black, Non-Hispanic	86.4 (76.7-96.0)*	54.7 (40.3-69.1)	55.2 (38.7-71.8)
Hispanic	68.6 (51.0-86.1)	29.2 (12.6-45.7)	42.2 (25.0-59.4)
Household Income			
Less than -\$34,999	*	33.2 (19.8-46.7)	39.5 (24.8-54.1)
\$35,000-\$74,999	*	40.6 (25.8-55.4)	61.7 (47.7-75.6)
\$75,000 +	*	54.5 (43.5-65.6)	58.5 (47.2-69.7)
Respondent Education			
High School Graduate or less	73.8 (59.2-88.5)	44.9 (30.4-59.3)	41.3 (27.6-55.1)
Attended College or Technical School	87.7 (79.3-96.0)*	41.9 (28.2-55.6)	57.9 (43.9-71.8)
College or Technical School Graduate	93.8 (90.2-97.4)*	46.0 (34.8-57.3)	58.4 (48.2-68.5)
Total	86.9 (81.8-91.9)	44.4 (37.0-51.8)	54.1 (46.5-61.7)

*Standard errors were larger than the allowable reported range—where there are significant differences, we have shown the estimate in italics to give a sense of the relationship, but the estimate is very imprecise and should be interpreted with caution. Based on the Rao-Scott Chi-Square Test, the percent taught what to do during an asthma episode is associated with age ($p=.0175$), race/ethnicity ($p=.0001$), and respondent education ($p=.0027$); the percent taught to use a peak flow meter is associated with age ($p=.0006$) and household income ($p=.0492$); and the percent given an asthma action plan is associated with age ($p=.0173$). Significant differences are shown in bold.

Environmental Changes

Environmental exposures are a major trigger for asthma, and efforts to reduce exposure are an important part of asthma management. Table 6 below describes the exposure of children with current asthma to various potential triggers and also efforts to reduce their exposure.

Table 6	
Percentage of Children with Current Asthma with Environmental Exposures and Actions Taken to Reduce Exposures, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% Confidence Interval)
Environmental Exposures in Home	
Gas used for cooking	79.7 (74.6-84.9)
Carpeting or rugs in bedroom	63.2 (56.2-70.2)
Pets inside home	56.1 (48.5-63.7)
Adult respondent is current smoker	22.7 (16.0-29.3)
Wood burning fireplace/stove	17.5 (12.0-23.1)
Cockroach, mice or rats (past 30 days)	13.0 (7.5-18.5)
Smoking inside home (past week)	8.5 (4.3-12.7)
Mold (past 30 days)	5.5 (2.4-8.6)
Average percent of exposures experienced (mean) ⁺	27.3 (25.7-28.8)
Actions to Reduce Exposure in Home	
Kitchen exhaust fan regularly used	64.1 (57.1-71.2)
Bathroom exhaust fan regularly used	53.7 (46.5-60.9)
Pets not allowed in bedroom (if inside pets)	45.4 (37.5-53.3)
Dehumidifier regularly used	42.3 (35.0-49.5)
Air cleaner/purifier regularly used	41.0 (33.8-48.3)
Sheets/pillowcases washed in hot water	40.2 (32.7-47.8)
Mattress cover used	36.0 (29.2-42.8)
Pillow cover used	35.3 (28.5-42.0)
Average percent of actions taken (mean) ⁺	44.2 (41.0-47.5)
Advised to change home/school/ work environment	38.6 (31.3-45.8)
Any Exposure to Animals, Mold, or Smoking at School or Child Care*	4.7 (2.5-6.9)

*For children who attend school or child care.

⁺The percent of exposures or actions was calculated for each child based upon the number reported over the total number possible for that child (cases where the respondent wasn't sure if they were exposed or took the action were excluded). Unvented gas appliances, which was too infrequent to report estimates in the table above, was used in calculating the percentage, and cockroaches and mice/rats were counted as separate exposures.

General caveat: these questions pose a risk for social desirability bias, where respondents may report what they believe to be a socially acceptable answer. This could lead to under-reporting of environmental exposures and over-reporting of the actions to reduce exposure.

We looked for differences in exposures (home and school or child care), actions in the home to reduce exposures, and advice to modify the home/school/work environment by sex, age, race/ethnicity, household income and respondent education. We found significant differences only with respect to actions taken to prevent exposure, discussed below in Table 7.

Table 7	
Percent with Reports of Above-Average Actions Taken* to Prevent Environmental Exposures in the Home, Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% Confidence Interval)
Sex	
Males	47.6 (38.7-56.5)
Females	47.7 (35.8-59.6)
Age	
0-4 years	39.8 (24.2-55.4)
5-9 years	54.3 (40.6-67.9)
10-14 years	45.8 (33.9-57.7)
15-17 years	46.5 (30.0-63.0)
Race/Ethnicity	
White, Non-Hispanic	64.5 (55.1-73.9)
Black, Non-Hispanic	23.0 (12.9-33.1)
Hispanic	42.0 (25.2-58.8)
Household Income	
Less than -\$34,999	27.7 (15.6-39.8)
\$35,000-\$74,999	52.5 (37.8-67.3)
\$75,000 +	54.6 (43.4-65.9)
Respondent Education	
High School Graduate or less	28.1 (17.6-38.6)
Attended College or Technical School	50.6 (36.8-64.3)
College or Technical School Graduate	56.7 (46.4-67.0)
Total	47.6 (40.5-54.6)

* For this analysis (and that of home exposures) we looked at the percent of possible exposures and actions taken (Table 6) for each child with current asthma and divided the distribution in approximately half such that children with 25 percent of possible exposures or higher were defined as above-average in terms of exposure while children with 50 percent of possible actions taken or higher were defined as above-average in terms of action taken.

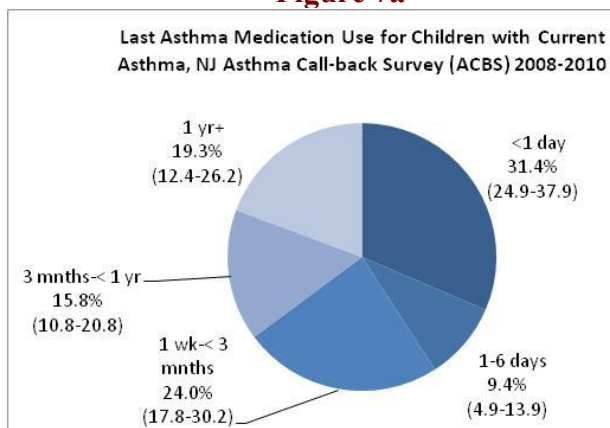
Based on the Rao-Scott Chi-Square Test, the percent with reports of above average actions is associated with race/ethnicity ($p < .0001$), household income ($p = .0062$) and respondent education ($p = .0037$). Significant differences are shown in bold.

Medications

There are two basic types of asthma medications. Long-term control medications are designed to be taken daily over the long term to maintain control of asthma symptoms. Quick relief medications are designed to provide fast relief for acute asthma symptoms.

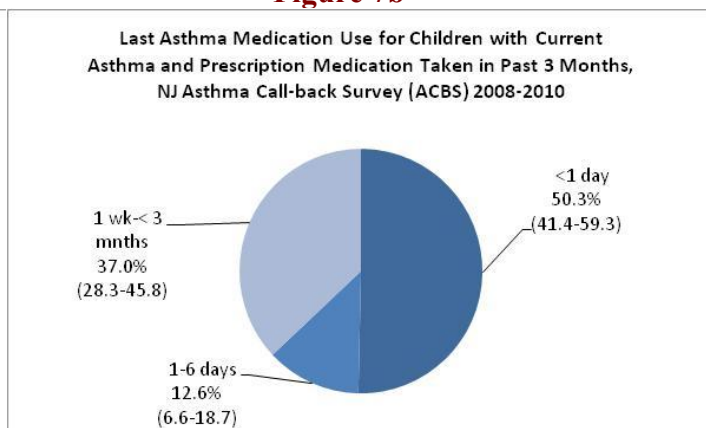
Among children with current asthma, nearly 61 percent had taken a prescription medication in the past three months. Most of those taking medication within the past three months were taking it frequently—about 50 percent reported taking medication within the past day. Figures 7a and 7b below show the time since last medication use.

Figure 7a



Note: includes prescription and nonprescription medication.

Figure 7b



Note: includes prescription and nonprescription medication.

Nearly 44 percent of children with current asthma were reported to have taken a long-term control medication in the past three months and nearly 54 percent had used a quick relief medication in that time. Thirty-six percent reportedly used both quick relief and long-term control medications in the past three months. Almost 40 percent of children with current asthma who had used long-term control medication in the past three months reportedly had proper use (on a daily schedule, not for episodes or attacks and not before exercise if the medication is not intended for this). About 59 percent of children with current asthma who had used quick relief medication in the past three months reportedly had proper use (for episodes or attacks and not on a daily schedule, and not before exercise if the medication is not intended for this). Nearly 44 percent were allowed to have their medications with them at school. Table 8 below shows details for all the findings for children with current asthma.

Table 8	
Medication Use among Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% CI)
Prescription medication taken in past 3 months	60.9 (53.4-68.4)
Any long-term control medicine in past 3 months	43.7 (36.3-51.1)
Proper use, inhaled long-term control medicine*	39.7 (31.0-48.4)
Any quick relief medicine in past 3 months	53.6 (45.8-61.4)
Proper use, inhaled quick relief medicine**	59.3 (51.3-67.3)
Type of medication used	
No prescription	39.9 (32.3-47.5)
Quick relief only	17.1 (11.7-22.5)
Long-term control only	6.9 (3.8-9.9)
Long-term control & quick relief	36.1 (28.6-43.6)
Ever used over-the-counter (nonprescription) for asthma	13.4 (9.0-17.8)
Ever used prescription inhaler	84.7 (78.6-90.8)
Health professional instruction on use?***	94.2 (91.0-97.4)
Health professional watched use?***	79.4 (72.9-86.0)
Asthma medication allowed with child in school	43.7 (37.1-50.3)

Note: Except where noted, medication means any form of medication (e.g., inhaler, pills, syrup, nebulizer). There was no significant change in prevalence from 2008 to 2010 on these measures.

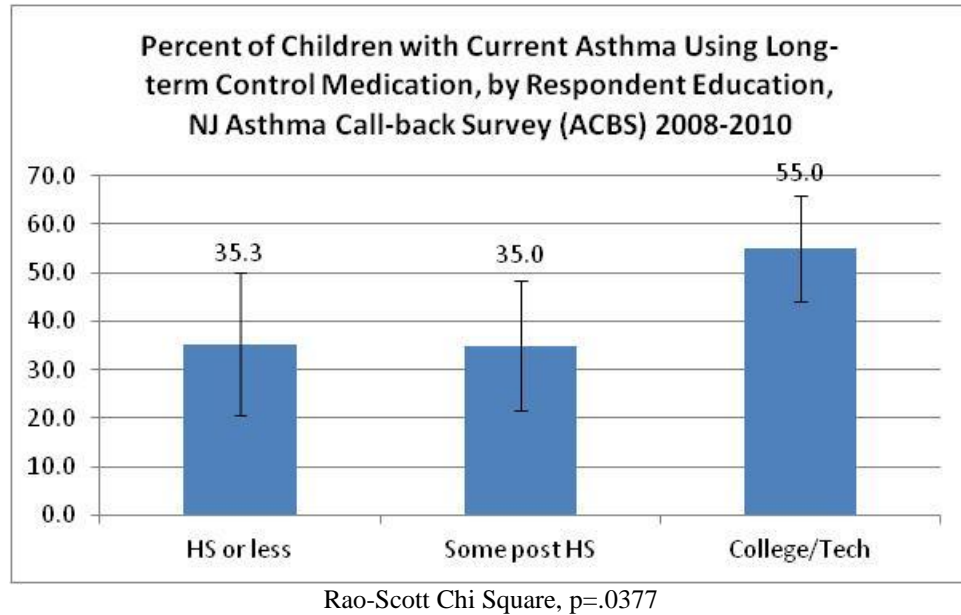
*Proper use is calculated only among those who used inhaled long-term control medication, and is defined as taking all inhaled long-term control medication on a schedule every day, not taking it medication for an attack and not taking it before exercise if it was not designed for this purpose.

**Proper use is calculated only among those who used inhaled quick relief medication, and is defined as not taking any inhaled quick relief medication on a schedule every day, taking it for an attack and not taking it before exercise if it was not designed for this purpose.

***Among those who have ever used a prescription inhaler.

There were suggestions of demographic differences in the proper use of both long-term control and quick relief medications, but there were insufficient numbers of cases to report this analysis. Respondents with higher levels of education reported a greater use of long-term control medications among children with current asthma, as shown in Figure 8 below. There was a similar pattern for the use of both long-term control and quick relief medication together, but it was not statistically significant ($p=.0605$).

Figure 8



Boys with current asthma had a greater likelihood of using both quick relief medications and long-term control and quick relief medications together, as shown in Figures 9a and 9b below. There was a similar pattern with respect to the use of any prescription medication, but this was not statistically significant ($p=.0716$).

Figure 9a

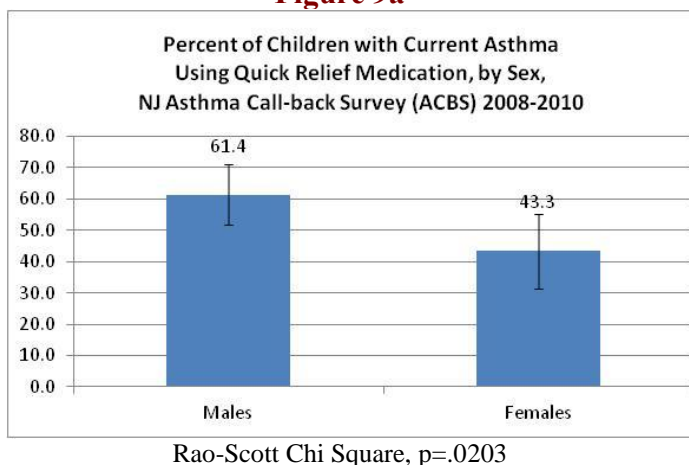
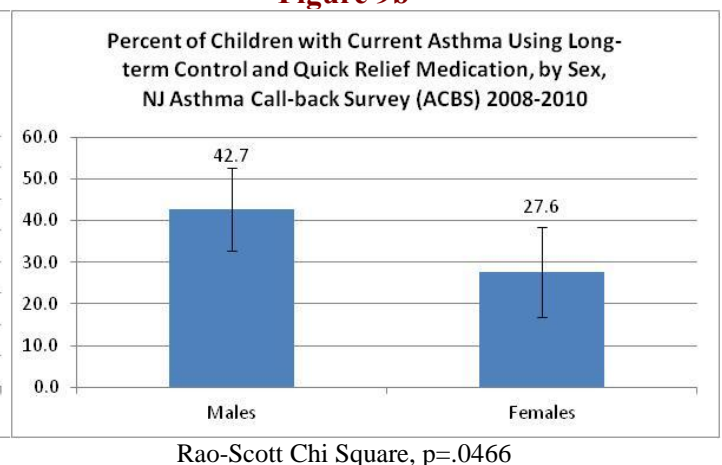
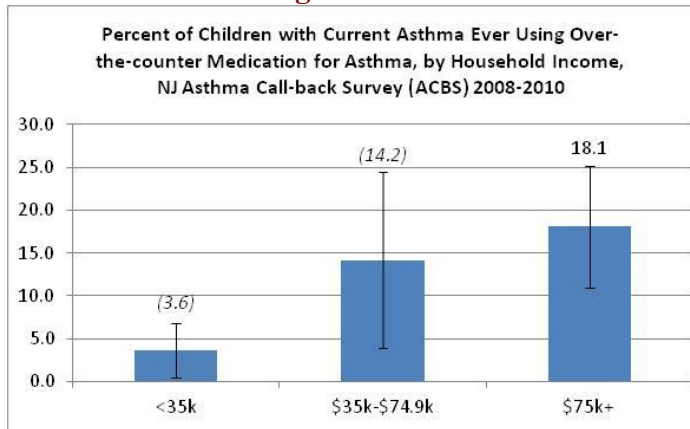


Figure 9b



The percent of children with current asthma who had ever used over-the-counter medication for their asthma varied with household income and respondent education, as shown below in Figures 10a and 10b. Children from the highest income households and with respondents with a college or technical degree were more likely to have been reported to use over-the-counter medication at some point for their asthma than those from the lowest income households or those with respondents who had a high school education or less.

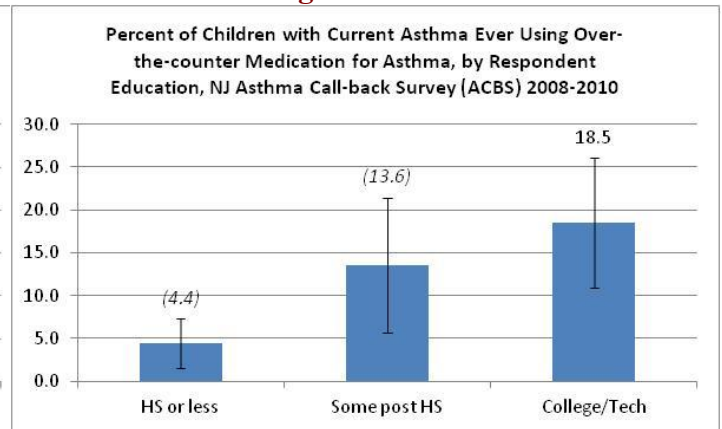
Figure 10a



Rao-Scott Chi Square, $p=.0108$

(Italicized numbers mean that the standard error is larger than the normal reportable range)

Figure 10b

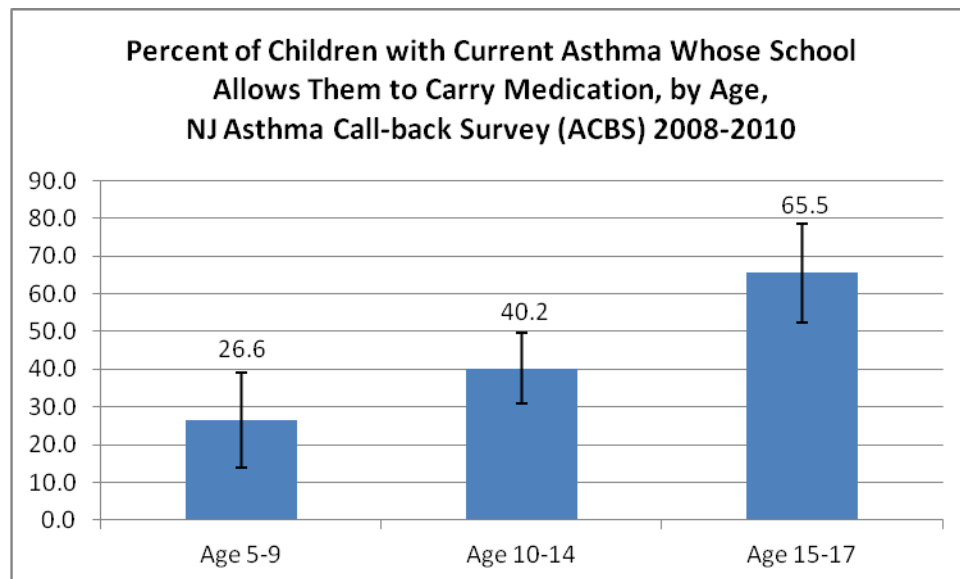


Rao-Scott Chi Square, $p=.0084$

(Italicized numbers mean that the standard error is larger than the normal reportable range)

The percent of children with current asthma whose schools allow medications to be carried by students with asthma varied by age, as shown in Figure 11 below (ages 0-4 are not shown because there were not enough cases for the result to be reliable).

Figure 11



Rao-Scott Chi Square, $p<.0001$

Cost Barriers

Respondents were asked if there was a time in the past 12 months when the child with current asthma needed primary care, specialist care, or medications for their asthma but were unable to access them because of the cost. There were too few reports of barriers to primary or specialist care to discuss these results. Nearly nine percent of children with current asthma were reportedly affected by one or most cost barriers in the past year. About seven percent of children with current asthma reportedly could not access asthma medications in the past year because of the cost. Detailed results are shown below in Table 9. There were too few cases to analyze potential demographic differences in cost barriers.

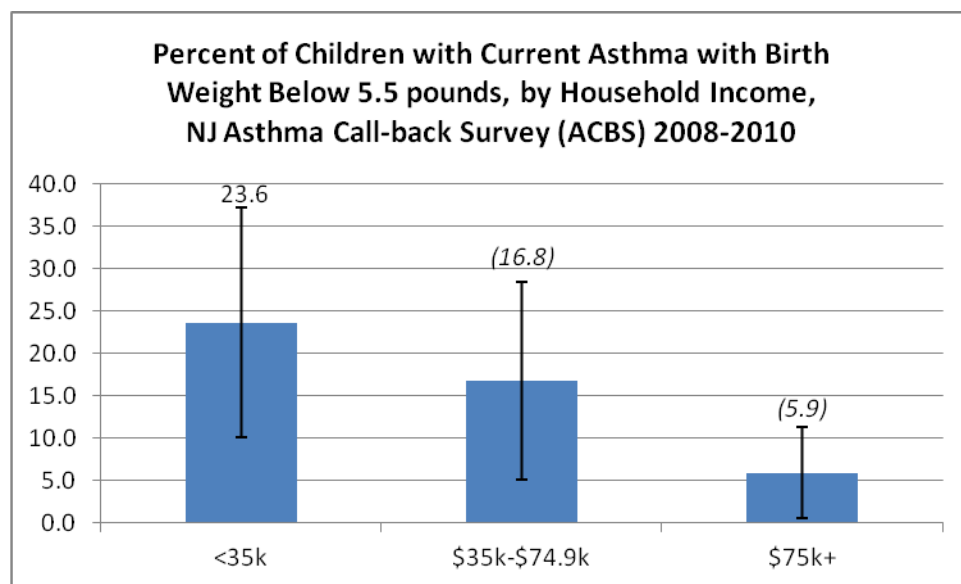
Table 9	
Cost Barriers among Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010	
	Percent (95% CI)
Any Cost Barrier (Primary care, specialist care, or medications)	8.8 (5.1-12.6)
Asthma Medication Cost Barrier	7.1 (3.7-10.5)

There was no significant change in prevalence from 2008 to 2010 on these measures.

Other Health Indicators: Birth Weight and Body Mass

About 13 percent (95 percent confidence interval 7.7-18.0 percent) of children with current asthma had a reported low birth weight of less than 5.5 pounds. The frequency of low birth weight did not vary over the 2008-2010 period. Having a low birth weight was associated with household income, as shown below in Figure 12.

Figure 12



Rao-Scott Chi Square, $p=.0230$

(Italicized numbers mean that the standard error is larger than the normal reportable range)

Table 10 below shows a breakdown of body mass index category by demographic category for children with current asthma. Nearly half of children with current asthma were under- or normal-weight, and roughly one quarter were either overweight or obese. The precision of the measurements is more doubtful than for many other issues because the heights and weights are based on the respondent's recollection and not done in a standardized way and also because it is not known when the measurements were done relative to the child's current age. Thus, these estimates are very approximate and should be interpreted with caution. There were significant differences by age and household income—older children were less likely to be obese, as were those from households with higher incomes.

Table 10			
Body Mass Index Category among Children with Current Asthma, NJ Asthma Call-back Survey (ACBS) 2008-2010			
	Under or Normal Weight	Overweight	Obese
	Percent (95% CI)	Percent (95% CI)	Percent (95% CI)
Sex			
Males	46.2 (35.8-56.7)	27.6 (18.1-37.2)	26.1 (18.2-34.0)
Females	52.0 (39.2-64.9)	20.4 (11.4-29.4)	27.6 (15.4-39.7)
Age			
2-4 years	**	**	**
5-9 years	32.4 (18.1-46.8)	26.8 (13.8-39.9)	40.7 (24.9-56.5)
10-14 years	43.3 (30.6-56.0)	34.7 (23.1-46.3)	22.0 (10.7-33.4)
15-17 years	84.0 (73.3-94.7)*	***	7.4 (2.1-12.7)*
Race/Ethnicity			
White, Non-Hispanic	53.7 (43.2-64.3)	20.4 (12.3-28.6)	25.8 (16.1-35.6)
Black, Non-Hispanic	**	**	**
Hispanic	**	**	**
Household Income			
Less than -\$34,999	34.4 (19.6-49.2)	23.1 (12.3-33.9)	42.5 (25.8-59.1)
\$35,000-\$74,999	54.8 (39.4-70.2)	19.9 (8.1-31.7)*	25.3 (13.1-37.5)
\$75,000 +	55.9 (43.9-67.9)	29.1 (17.6-40.5)	15.1 (8.1-22.1)
Respondent Education			
High School Graduate or less	34.4 (19.9-48.9)	22.4 (8.9-35.9)*	43.2 (27.2-59.2)
Attended College or Technical School	49.1 (33.9-64.3)	23.7 (10.9-36.4)	27.3 (13.3-41.3)
College or Technical School Graduate	54.2 (42.7-65.7)	25.8 (16.5-35.1)	20.0 (11.4-28.7)
Total	48.8 (40.6-57.0)	24.5 (17.8-31.1)	26.8 (19.8-33.7)

*Standard errors were larger than the allowable reported range—we have generally shown the estimate in italics, but it is very imprecise and should be interpreted with caution.

**Too few cases to report findings.

***Confidence interval exceeded zero or 100.

Body Mass Index Category is calculated using a CDC SAS program and utilizing CDC guidelines for BMI percentiles for children whose sex, age, height and weight are known. For age, the CDC imputed value is used if the respondent did not give a value (we also ran the analysis excluding the imputed age values and the results did not change, but the lowest income category would not have enough cases to report on). The age is calculated as of the date of the survey, but the dates of measurement of height and weight are unknown—these measures are based on the respondent's report as of the date of the survey. Ideally, measurements are taken in a standardized way and the age is the date of measurement. Thus, these data are subject to a lot of error and should be interpreted with caution. Children under 24 months of age and those with biologically implausible values are excluded from the calculations. All heights are assumed to be standing heights as opposed to recumbent length measurements.

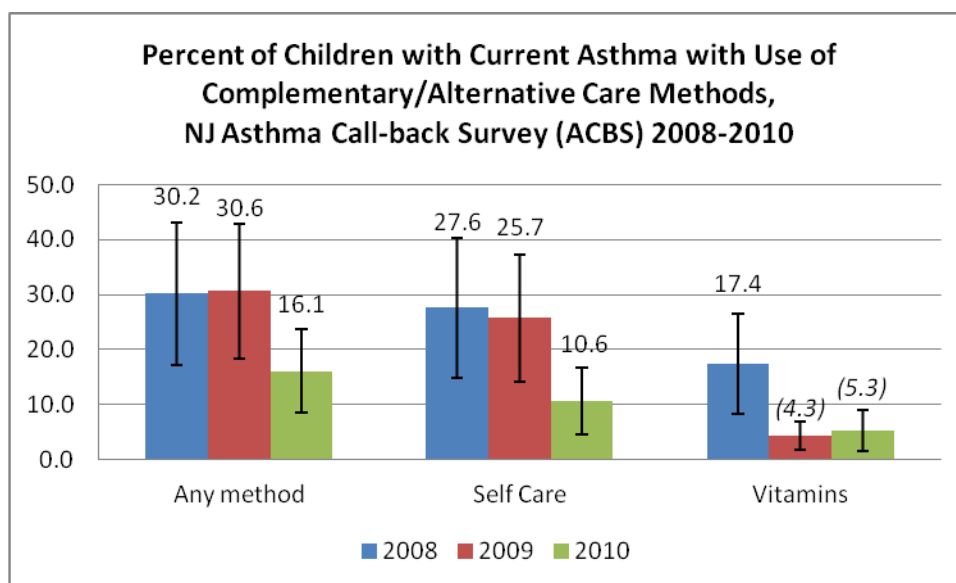
There were no significant differences in prevalence from 2008-2010 on this measure. Based on the Rao-Scott Chi-Square Test, Body Mass Index category differences are associated with age ($p < .0001$), and household income ($p = .0090$).

Complementary and Alternative Care

Respondents for children with current asthma are asked about use of complementary or alternative care, which consists of a variety of practices and products not currently considered part of conventional medicine that are used together with conventional medicine (complementary) or in place of conventional medicine (alternative). Respondents can report on ten different methods including six that are self-care (herbs, vitamins, aromatherapy, homeopathy, yoga and breathing techniques) and four that are practitioner-based (acupuncture, acupressure, reflexology and naturopathy). Most techniques were not common enough to develop reliable estimates. The only method that was stable over the reporting period and had reportable findings was breathing techniques, reported by nearly 13 percent of respondents in 2008-2010 (95 percent confidence interval 7.5-17.9 percent). There were no demographic differences in the reported use of this method.

The use of any complementary or alternative method from 2008 to 2010 ranged from a low confidence interval value of 8.5 percent (2010) to a high of 43.2 percent (2008), as shown below in Figure 13. The difference over the years was not statistically significant, but the patterns for both any method and all self-care methods combined showed a drop in 2010, with self-care methods coming close to statistical significance. The use of vitamins to help control asthma showed a significant drop after 2008. The frequency of all self-care methods and vitamins are also shown in Figure 13. There were no demographic differences in the reported use of any (i.e., one or more) methods.

Figure 13



Rao-Scott Chi Square, $p=.1286$ for any method, $.0515$ for self-care & $.0001$ for vitamins
(Italicized numbers mean that the standard error is larger than the normal reportable range)

Acronyms:

CI – Confidence Interval

BMI – Body Mass Index

ACBS – Asthma Call-back Survey

Definitions:

Lifetime Asthma – Proportion of the population who have ever had an asthma diagnosis (on the NJBRFS, a “Yes” response to “Have you ever been told by a doctor or other health professional that you have asthma?”)

Current Asthma – Proportion of the population who reports having asthma at the time of the survey (on the NJBRFS, a “Yes” response to “Do you still have asthma?”)

Former Asthma – Proportion of the population who reports not having asthma at the time of the survey (on the NJBRFS, a “No” response to “Do you still have asthma?”)

Confidence Interval – A range of values within which the actual value is likely to fall

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Acknowledgements:

This chapter was developed by the New Jersey Asthma Awareness and Education Program within the NJDOH Division of Family Health Services' Chronic Disease Prevention and Control Services. The NJDOH Center for Health Statistics administers the NJBRFS/ACBS and provided technical assistance and statistical support.

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For more information about the NJ Asthma Awareness and Education Program:

www.nj.gov/health/asthma

For asthma resources from the Pediatric Adult Asthma Coalition of New Jersey (PACNJ):

www.pacnj.org

For more information about the BRFSS:

www.cdc.gov/brfss

For more information about the Asthma Call-back Survey:

<http://www.cdc.gov/brfss/acbs/index.htm>

Funding for this effort was provided by the CDC Cooperative Agreement entitled *Addressing Asthma from a Public Health Perspective* (1U59EH000491-03). The contents are solely the responsibility of the authors and do not necessarily represent the official view of the CDC.